STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Materials Technology**		Code **1010134241010130898**
Field of study **Environmental Engineering Extramural First-**	Profile of study (general academic, practical) **(brak)**	Year /Semester **2 / 4**
Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **part-time**	
No. of hours Lecture: **20** Classes: **-** Laboratory: **20** Project/seminars: **-**		No. of credits **4**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**	
Education areas and fields of science and art **technical sciences** **Technical sciences**		ECTS distribution (number and %) **4 100%** **4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Chemistry and physics: basic terms related to properties of solids and liquids.
2	**Skills**	Ability to read technical drawings.
3	**Social competencies**	Awareness of need to constantly update and supplement knowledge and skills.

Assumptions and objectives of the course:

Acquire of basic knowledge and skills in materials technology and fittings techniques essential to solving typical practical problems appear in environmental engineering.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student knows basic chemical, physical, mechanical and technological features of materials used in environmental engineering and understand theirs significance (effect achieved during lectures) - [K_W02, K_W05, K_W07]
2. Student has a basic knowledge concerning of using metals and alloys, polymers and sanitary ware in environmental engineering (effect achieved during lectures) - [K_W02, K_W05, K_W07]
3. Student has a basic knowledge concerning of using various kind of fittings in accordance with piping materials (effect achieved during lectures) - [K_W02, K_W05, K_W07]
4. Student knows and understands principle of various kind of valves (effect achieved during lectures) - [K_W02, K_W05, K_W07]
5. Student has a knowledge concerning of materials resistance at external factors (effect achieved during lectures) - [K_W02, K_W05, K_W07]
6. Student understands the need for appropriate selection of materials in accordance with their properties (effect achieved during lectures) - [K_W02, K_W05, K_W07]
7. Student knows and understands limitations of fitting techniques used in environmental engineering (effect achieved during lectures) - [K_W02, K_W05, K_W07]

Skills:

1. Student can show possible application of individual materials in environmental engineering (effect achieved during laboratories) - [K_U01, K_U013]
2. Student can select material for projects for technical subjects at next years of studies (effect achieved during laboratories) - [K_U01, K_U05, K_U013]
3. Student can point at possible kind of jointing for individual materials (effect achieved during laboratories) - [K_U01, K_U013]
4. Student can show application of individual kind of valves (fittings) (effect achieved during laboratories) - [K_U01, K_U013]

Social competencies:

1. Student understands the need for teamwork in solving theoretical and practical problems (effect achieved during laboratories) - [K_K03, K_K04]
2. Student is aware of the advantages, disadvantages and limitations technical solutions applied (effect achieved during laboratories) - [K_K01, K_K05]
3. Student sees the need for systematic increasing his skills and competences (effect achieved during laboratories) - [K_K01]
4. Student is aware of fundamental principles of industrial safety during installation work (effect achieved during laboratories) - [K_K01, K_K04, K_K05]

Assessment methods of study outcomes

Lectures

Written final multianswer test (effects W1 to W7). Mark scale (percentage / mark): 0-50 ndst, 51-60 dst, 61-70 dst+, 71-80 db, 81-90 db+, 91-100 bdb

Laboratory

Written final multianswer test (effects K1, K2, K3, U1, U2). Work in groups (effects K2, K3, K4, U1, U3, U4). Threshold to pass 50%.

Course description

Basic chemical, physical, mechanical and technological properties of materials used in environmental engineering.

Group of materials used in environmental engineering: iron alloys, cupper, cupper alloys, other metals and their alloys, polymers, sanitary ware. Advantages, disadvantages and limitations in using of individual materials. Possible interactions between different materials or between them and environment. Classification of materials due to their properties, production technology etc. Materials marking methods. Methods and technologies for materials jointing. Tools and equipment used in various jointing technologies.

Valves (fittings) used in environmental engineering (classification, applications, advantages, disadvantages and limitations in using).

Special technical solutions of sanitary installations.

Practical exercise:

1. Sorts and dimensionig of instalation element joints
2. Screwed connection of steel pipes
3. Soldered connections of copper pipes
4. Glued connections, welded and clamped connections of plastic pipes
5. Corrosion process of selected metals and their alloys
6. Fittings
7. Identification of polymers, properties of mineral materials

Education method

Lectures (conversatory and problem elements of lectures) using multimedia presentation.

Laboratory clases with demonstration and assembly of instalation elements.

Basic bibliography:

1. Bagieński J., Materiałoznawstwo instalacyjne, Wydawnictwo Politechniki Poznańskiej, Poznań 1985
2. Bagieński J., Materiałoznawstwo instalacyjne, Wydawnictwo Politechniki Poznańskiej, Poznań 1985
3. Płuciennik M., Zimmer J., Projektowanie instalacji wodociągowych wody zimnej i ciepłej, Instytut Techniki Budowlanej, Warszawa 2012
4. Adamski M., Materiałoznawstwo instalacyjne. Ćwiczenia laboratoryjne, Wydawnictwo Politechniki Białostockiej, Białystok 2006

Additional bibliography:

1. Lars-Eric J., Rury z tworzy sztucznych do zaopatrzenia w wodę i odprowadzania ścieków, Polskie Stowarzyszenie Producentów Rur i Kształtek z Tworzyw Sztucznych, Toruń 2010
2. Hyla I., Tworzywa sztuczne. Własności-przetwórstwo-zastosowanie, Wydawnictwo Politechniki Śląskiej, Gliwice 2004
3. Lars-Eric J., Rury z tworzy sztucznych do zaopatrzenia w wodę i odprowadzania ścieków, Polskie Stowarzyszenie Producentów Rur i Kształtek z Tworzyw Sztucznych, Toruń 2010
4. Hyla I., Tworzywa sztuczne. Własności-przetwórstwo-zastosowanie, Wydawnictwo Politechniki Śląskiej, Gliwice 2004

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	20
2. Participation in practical exercises	20
3. Preparation for the practical exercises	20
4. Preparation for the exam	38
5. Presence at the exam	2

Student's workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	42	2
Practical activities	40	2